



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 8**

1595 Wynkoop Street  
DENVER, CO 80202-1129  
Phone 800-227-8917  
<http://www.epa.gov/region08>

**SEP 22 2008**

Ref: 8EPR-N

Colonel David C. Press  
Omaha District Commander  
U.S. Army Corps of Engineers, Omaha District  
1616 Capital Avenue  
Omaha, Nebraska 68102

Re: Northern Integrated Supply Project (NISP),  
Northern Colorado, Draft Environmental Impact  
Statement CEQ # 200870167; CWA Section 404  
Permit Public Notice No. 200380509

Dear Colonel Press:

The United States Environmental Protection Agency, Region 8 (EPA), has reviewed the U.S. Army Corps of Engineers' (Corps) Draft Environmental Impact Statement (DEIS) for the Northern Integrated Supply Project (NISP). EPA offers these comments in accordance with the Agency's responsibilities under the National Environmental Policy Act (NEPA), 42 U.S.C. Section 4332(2)(C), Section 309 of the Clean Air Act, 42 U.S.C. Section 7609, and Section 404 of the Clean Water Act (CWA), 33 U.S.C. 1344.

NISP is a regional water supply project designed to provide water to 12 towns and water districts (the Participants) in northern Colorado. The Northern Colorado Water Conservancy District (District) is the entity facilitating and coordinating this action, representing the Participants. The proposed project would be constructed and owned by the District. The purpose of the project is to meet a portion of their projected future demand by providing the Participants with approximately 40,000 acre-feet of new reliable municipal water supply annually through a regional project.

Four alternatives were evaluated in the DEIS, but the DEIS does not identify a preferred alternative. Alternative 1, the No Action Alternative, assumes no regional water supply project; rather, the Participants would develop independent water supplies by purchasing water rights and pursuing independent storage and conveyance systems. Alternative 2, construction of Glade Reservoir (170,000 acre-feet of water) and the South Platte Water Conservation Project, which includes Galeton Reservoir (40,000 acre-feet), is the District's proposed action. Alternative 3 is the construction of Cactus Hill Reservoir (180,000 acre-feet) and the South Platte Water Conservation Project, including Galeton Reservoir. Alternative 4 is the construction of Glade Reservoir and the South Platte Water Conservation Project with a smaller Galeton Reservoir and the transfer of agricultural water rights (12,000 acre-feet of firm yield).

Two of the action alternatives will require the realignment of seven miles of U.S. Highway 287 near Fort Collins, Colorado. Therefore, the DEIS also serves as the NEPA analysis for the Federal Highway Administration for this highway project. In addition, the Bureau of Reclamation also may use this DEIS as the NEPA analysis for its decisions to authorize connections of a pipeline and/or enter into a contract with the District for storage and/or exchange of water.

EPA is concerned that the DEIS should more fully analyze the project's water quality impacts and more fully address the CWA Section 404(b) (1) Guidelines. Moreover, EPA believes that once these analyses are completed, the results are likely to show that the project has the potential to cause significant impacts to Colorado's natural resources, including impacts to the impaired waters of the Cache la Poudre River (Poudre River) and to the South Platte River, both of which are Aquatic Resources of National Importance (ARNIs). EPA also believes that the impacts to the Poudre River and the South Platte River from changes in stream morphology due to significantly reduced flows in the river may be more severe than discussed in the DEIS. Lastly, EPA's review indicates that the potential for this project not to meet water quality standards warrants further analysis in the DEIS. This letter summarizes those major concerns and additional significant concerns, and details on these and other issues are presented in the enclosure.

#### **Water Quality and Flow Analysis**

*Water Quality Analysis:* EPA believes that the DEIS may not adequately address the project's potential to exacerbate existing water quality impairments to the Poudre River and Horsetooth Reservoir. The Colorado Water Quality Control Commission has identified two segments of the Poudre River as impaired due to exceedance of the applicable State water quality standards for pH, copper, selenium, and *E. coli*. Horsetooth Reservoir is listed as impaired for dissolved oxygen and mercury. The DEIS and associated technical reports (Technical Reports) cite some analyses for certain parameters at selected locations on the Poudre River, but they do not address *E. coli* (for which the Poudre River, from Boxelder Creek to the South Platte River was listed as impaired on the 2006 and 2008 303(d) lists), nor do they adequately document or analyze the potential for further exceedances of water quality standards, and the potential impacts of reduced water flow in the Poudre River on the associated pollutant loading and concentration.

The water quality analyses discussed in the DEIS used modeled monthly flows and mass balance calculations to estimate the changes in water quality due to the project alternatives at six locations. However, neither the DEIS nor supporting water quality reports provided sufficient details of the analysis (assumptions and specific methods, data and findings) or enough in-depth information on the impacts of the project to the impaired segments of the Poudre River to fully assess the project. EPA is concerned that the proposed project may cause or contribute to further water quality standards exceedances on those segments of the Poudre River and Horsetooth Reservoir that are already impaired. EPA believes that the DEIS may not adequately analyze these significant and potentially environmentally unsatisfactory impacts. In addition, EPA believes the analysis would have been more effective if it relied upon the State of Colorado's



methodology of impairment assessment for the State's CWA 303(d) list, which evaluates pollutants of concern on a segment by segment basis, and compares existing conditions to future modeled conditions and applicable water quality standards.

In addition to the pollutants for which the Poudre River is already impaired, EPA is concerned that the DEIS may not adequately analyze for the project's temperature and dissolved oxygen impacts. Additionally, despite identifying temperature and dissolved oxygen effects as expected impacts of the project that could affect the current aquatic life use designations, the DEIS does not discuss mitigation for these impacts. Further, it is not appropriate for the DEIS to have used the temporary modifications to standards for copper and ammonia (due to expire in 2009 and 2011, respectively) in its evaluation of compliance with the standards. In these circumstances, it is more appropriate to use the underlying water quality standards to determine compliance.

EPA also believes that the DEIS may not adequately address the potentially significant impacts of the project to wastewater treatment plants and other permitted dischargers downstream of the proposed reservoirs. The mass balance analysis in the DEIS assumes that when the project is implemented, water quality upstream of each of the wastewater treatment plants analyzed is going to be the same as it is now, except for flow; this is an incorrect assumption. EPA believes it would be more appropriate to use a cumulative approach for the mass balance calculations, with each wastewater treatment plant recalculated based on changes upstream. There are other technical concerns with the analysis, explained in the enclosed detailed comments. EPA recommends that, in order to address these significant inadequacies, the Corps provide additional analyses of impacts to the permitted facilities with a water quality assessment equivalent to that used by the Colorado Water Quality Control Division in developing permit limits.

*Analysis of Impacts to Poudre River and South Platte River stream morphology/aquatic life:*

EPA believes that the DEIS and Technical Reports may not provide an adequate assessment of how changes in the spring peak flows will influence sediment deposition, changes in channel complexity, or the aquatic communities. The DEIS states that the proposed action will reduce the average monthly stream flow on the Poudre River and South Platte River, with the greatest reductions occurring during high flow months (May to July). Spring peak flows will be reduced by as much as 71% in an average year in portions of the Poudre River, and 26% in a dry year, and by as much as 15% in portions of the South Platte River. The reduction in flows may result in an inability to support aquatic life use standards due to expected changes in ambient environmental conditions such as temperature, dissolved oxygen, fine sediment deposition and habitat availability. Given these potential impacts, EPA believes that changes in aquatic communities associated with the proposed flow reductions may not be beneficial, (which is what the DEIS concludes), will fundamentally change the character of the Poudre River, and will affect the South Platte River to a lesser degree. The additional analysis EPA believes necessary on how the reduced spring flow will impact channel complexity and aquatic communities is addressed further in the detailed comments enclosed.



*Analysis of Total Organic Carbon Impacts to Horsetooth Reservoir:* EPA is also concerned that the DEIS may not adequately address the impact of the project on total organic carbon (TOC) levels and the subsequent chlorinated disinfection byproducts in Horsetooth Reservoir. Water from the new Glade Reservoir will be conveyed to Horsetooth Reservoir for distribution. While the DEIS states that the water quality of Horsetooth Reservoir would not be negatively affected by inflows from Glade Reservoir from this project (DEIS p. 4-35), EPA believes that, given the projected concentrations of TOC in Glade Reservoir and Horsetooth Reservoir, treatment of this water will likely result in an increase of chlorinated disinfection byproducts, which are likely carcinogens. This is of particular concern because the City of Fort Collins obtains a portion of its public drinking water from Horsetooth Reservoir.

*Analysis of Groundwater and Riparian Wetland Impacts:* In addition, EPA is concerned that the DEIS may not provide an adequate assessment of impacts the project will have on groundwater recharge and stream baseflow, and consequent impacts on riparian and riverine ecology. Removal of the snowmelt-dominated spring peak flows at the mouth of the Poudre Canyon has critical implications for groundwater and alluvial recharge in the downstream reaches of the Poudre and South Platte Rivers, but the DEIS does not thoroughly evaluate these potential impacts. Consequently, the DEIS concludes that there would be no negative effects to groundwater quality or quantity (DEIS pages 4-39-4-41). This conclusion is not adequately supported by the Technical Reports.

In a related matter, the groundwater and alluvial recharge impacts from this project may also impact riparian and wetland resources to a much greater degree than suggested in the DEIS. Once impacts to groundwater have been adequately quantified, a re-analysis of the vegetative communities will be necessary to assess the subsequent impacts on riparian and wetland resources.

*Analysis of Impacts to the South Platte River from Galeton Reservoir and Water Exchange:* Although the geologic formations of the Galeton Reservoir and forebay area associated with this reservoir suggests that the disturbances associated with construction and operation are likely to increase both selenium and salinity transport, the DEIS does not assess the potential impacts of both of these contaminants on water quality in the South Platte River watershed. The document should address the potential for Cretaceous shale soils underlying the Galeton Reservoir and forebay area to increase selenium and salinity in this watershed.

#### **Clean Water Act Section 404 Issues**

EPA is providing comments on the public notice for the District's CWA Section 404 permit application for the project, which the Corps circulated for public review concurrently with the DEIS. The Corps intends for the DEIS to address compliance with the CWA Section 404(b)(1) Guidelines, 40 CFR Part 230 (Guidelines). EPA believes the DEIS has not provided sufficient information to determine compliance with the Guidelines in accordance with 40 CFR §230.12 due to: 1) inadequate analysis regarding the availability of less environmentally damaging practicable alternatives (40 CFR §230.10(a); 2) inadequate information and analysis regarding potential violations of State water quality standards (40CFR §230.10(b)); 3) inadequate



information and analysis regarding the potential for the proposed action to cause or contribute to significant degradation of waters of the U.S., specifically the Poudre and the South Platte Rivers (40CFR §230.10(c); and 4) lack of a detailed mitigation plan (40CFR §230.10(d)). EPA believes that additional analyses are necessary before the Corps proceeds with the decision on the CWA Section 404 permit.

Thus, the proposed action may result in substantial and unacceptable impacts to the Poudre River and South Platte River, which EPA has determined to be aquatic resources of national importance (ARNIs). Pursuant to CWA Section 404(q) and Part IV(3)(a) of the 1992 Memorandum of Agreement between EPA and the Corps, EPA requests that the Corps re-evaluate the practicable alternatives that may be available.


### **EPA's Rating**

In accordance with EPA's policies and procedures for reviews under NEPA and Section 309 of the Clean Air Act, EPA has rated the DEIS as "Environmental Objections - Insufficient Information" ("EO-2"). This rating is based primarily on our concern that the DEIS may not contain sufficient information to fully assess the potential water quality and wetland impacts, and that the proposed action alternatives may have significant impacts that should be avoided in order to adequately protect the environment. A description of EPA's EIS rating system is enclosed.

EPA remains committed to working with the Corps and other stakeholders to improve the analysis of potential impacts of this proposal as we coordinate to identify an alternative that satisfies the project purpose and ensures effective protection for human health and the environment. I would like to emphasize, however, that as a Cooperating Agency regarding the preparation of the DEIS, I am disappointed that EPA was not provided an opportunity to provide input and comment on any preliminary drafts of the water quality analysis prior to its release in the DEIS. EPA is well-positioned to help in the preparation of a thorough and meaningful water quality analysis consistent with the requirements of NEPA and the CWA. I have made this effort a high priority for me and my staff. I look forward to talking with you personally to discuss how we can work together most effectively as this permit evaluation moves forward.

Sincerely,



 Carol Rushin  
Acting Regional Administrator

cc: Martha Chieply, Branch Chief, Army Corps of Engineers, Omaha District  
Chandler Peter, U.S. Army Corps of Engineers, Omaha District









**Northern Integrated Supply Project**  
**Draft Environmental Impact Statement**  
**EPA Detailed Comments**

**Water Quality/Flow Analyses**

*Analysis of Impacts on Impaired Waters:* EPA believes that the DEIS does not adequately address the project's potential to exacerbate existing water quality impairments to the Cache la Poudre River (Poudre River) and Horsetooth Reservoir. The Colorado Water Quality Control Commission (WQCC) has identified two segments of the Poudre that are impacted by NISP as impaired due to exceedence of the applicable State water quality standards (WQS). These two segments are included on the 2008 Colorado Clean Water Act (CWA) Section 303(d) List of Threatened and Impaired Waters for pH, copper, selenium, and *E. coli*.<sup>1</sup> Horsetooth Reservoir is listed as impaired for dissolved oxygen, and mercury. The two 303(d)-listed Poudre River segments are directly downstream of the proposed project and the Horsetooth Reservoir is a potential downstream receiving water via the project's proposed pipeline. See Table 1 below and the 2008 Colorado Section 303(d) List Water Quality-Limited Segments Requiring TMDLs.

The DEIS and Water Quality Technical Report (WQTR) acknowledge the waters downstream of NISP are on the 2006 Colorado CWA 303(d) list (see DEIS p.3-25 and WQTR p. 17, respectively), but do not indicate that they are also on the 2008 Colorado CWA 303(d) list.

EPA recognizes that preparation of many of the NISP DEIS materials began while the State's 2008 assessment and 303(d) listing process were underway. Nevertheless, the final 2008 Colorado 303(d) list of impaired waters was adopted by the WQCC on March 11, 2008, and became effective April 30, 2008. This updated list of impaired waters potentially impacted by the proposed project should be acknowledged and analyzed. Further, potential effects to CWA 303(d)-listed waterbodies should be fully analyzed and disclosed for public review. Such analysis should be at a level of detail sufficient to reveal any potential impacts for the proposed project, and disclose the necessity and direction of mitigation.

---

<sup>1</sup> Waterbodies failing to attain applicable WQS are to be identified on a state's biennial 303(d) List of Threatened and Impaired Waters under the CWA. The CWA requires states to develop a Total Maximum Daily Load (TMDL) for each impaired waterbody-pollutant combination, calculating the point-source and nonpoint-source pollutant reductions necessary to bring the waterbody into compliance with applicable WQS. The TMDL point-source reduction targets are generally implemented as water quality limits in federal and state-issued National Pollutant Discharge Elimination System (NPDES) discharge permits. The TMDL nonpoint-source reduction targets are generally implemented through state and federally-funded (e.g., CWA Section 319 nonpoint source pollution reduction) measures and programs. Hence, any potential degradation of impaired waters is a significant concern and potential impediment to water quality remediation requirements and efforts.





Table 1. Colorado 2008 303(d)-Listed Waters Potentially Affected by NISP

| State Waterbody ID | Segment Description                               | Portion          | Impairment                                    | Priority   |
|--------------------|---|------------------|---|------------|
| COSPCP10           | Cache la Poudre R., Monroe Canal to Shields St.   | All              | pH, Copper                                    | Medium     |
| COSPCP12           | Cache la Poudre R., Box Elder Ck. to S. Platte R. | All              | Selenium                                      | Low        |
| COSPCP12           | Cache la Poudre R., Boxelder Ck. to S. Platte R.  | below Eaton Draw | <i>E. coli</i>                                | High       |
| COSPCP14           | Horsetooth Reservoir                              | All              | Diss. Oxygen, Aquatic Life Use (mercury FCA*) | Low / High |

\* Horsetooth Reservoir Aquatic Life Use impaired as demonstrated by Fish Consumption Advisory for elevated mercury levels present in fish tissue.

The DEIS and Technical Reports do not address *E. coli*, for which the Poudre River, from the Boxelder confluence to the South Platte River, is listed as impaired on the 2006 and 2008 Colorado CWA 303(d) lists. On this issue, the Water Quality Technical Report (WQTR) simply states “*E. coli* concentrations in the Poudre River were not collected or analyzed for this report, but it is expected that during months with reduced flows, *E. coli* concentrations would increase due to less dilution.” (WQTR, p. 48) Furthermore, EPA is concerned that the DEIS’ analyses of other pollutants and general descriptions of findings do not adequately analyze the project’s potential to further degrade water quality in these impaired stream reaches. Specific findings are not provided, nor compared to the applicable WQS. EPA recommends that projected changes for all water quality parameters that could potentially violate applicable WQS be analyzed and that the specific results of all analyses (for all parameters analyzed and for all months) be presented in the Final EIS, showing projected changes in comparison to applicable WQS (see, e.g., WQTR, p.45, Table 14).

Many of the point and nonpoint pollutant loading sources enter the system downstream of the proposed Glade Reservoir withdrawal. EPA is concerned that the DEIS projection of a downstream reduction on pollutant loading proportional to the reservoir withdrawal may not be supported. The reduction in water flow would typically be expected to exacerbate already impaired water quality conditions by reducing available dilution without proportionately reducing pollutants. EPA recommends that all of the impaired waters in the immediate watershed be clearly acknowledged, and that pollutant loading in the watershed be fully discussed, including a discussion of current ambient conditions and realistic potential changes for all pollutants potentially exceeding WQS. EPA recommends that this discussion include potential mitigation and potential cost burdens to downstream entities to address potential exacerbation of existing water quality impairments.

In addition to the pollutants for which the Poudre River is already impaired, the DEIS does not adequately analyze and disclose the impacts to and from projected changes in temperature and dissolved oxygen, which the DEIS identifies as expected impacts of the project (DEIS Section 4.5.3.2). Temperature may increase and dissolved oxygen may be reduced with





reduced flows, slower instream currents and waning sediment and organics transport. The DEIS does not adequately disclose future changes to these parameters associated with significant flow reductions. These parameters may have significant effects on other regulated pollutants (e.g., ammonia). Temperature and dissolved oxygen changes should therefore be more fully analyzed and discussed as well.

EPA notes that the downstream state of Nebraska lists the South Platte (immediately across the Colorado/Nebraska border) as impaired for selenium on the State 2008 303(d) List of Threatened and Impaired Waters. EPA recommends that the Final EIS reference this listing and assess any potential changes to selenium concentrations in the South Platte River.

An additional concern is how the DEIS treats and uses temporary modifications to WQS that are due to expire in the next several years. The WQCC has provided temporary variances to the existing, underlying WQS for copper and ammonia for Poudre segments COSPCP11 and COSPCP12 and for ammonia for South Platte segment COSPMS1b (see Table 2 below, or the WQCC Regulations website: <http://www.cdphe.state.co.us/regulations/wqccregs/index.html> [Regulation 38, Tables, pp. 30-31 and p. 24, respectively]). Because it is uncertain what action the Colorado WQCC will take with respect to these WQS upon their expiration dates, EPA recommends that the analysis follow the published State protocol for assessments provided in the Colorado Section 303(d) Listing Methodology – 2008 Listing Cycle, p.27, Section I: Temporary Modifications. A similar protocol exists for State-issued discharge permits to waters with temporary modifications to WQS. Consistent with these protocols, EPA recommends that the analysis use the underlying WQS for all analyses and assessment purposes where temporary modifications exist.

Table 2. Temporary Modifications to Water Quality Standards in South Platte Basin Waters Potentially Affected by NISP

| State Waterbody ID | Segment Description   | Temporary Modifications   |
|--------------------|---|---|
| COSPCP11           | Mainstem of Cache la Poudre R. from Shields St. to Boxelder Ck.     | Copper (acute/chronic)=Current Condition. Expires 12/31/2009.<br><br>Ammonia (acute/chronic)=TVS(old) Expires 12/31/2011. |
| COSPCP12           | Mainstem of Cache la Poudre R. from Boxelder Ck. to South Platte R. | Copper (acute/chronic)=Current Condition. Expires 12/31/2009.<br><br>Ammonia (acute/chronic)=TVS(old) Expires 12/31/2011. |
| COSPMS1b           | South Platte R. from Saint Vrain Ck. to Weld/Morgan County Line     | Copper (acute/chronic)=Current Condition. Expires 12/31/2009.   |





*Disclosure of Water Quality Analysis Methods and Findings:* The DEIS and Technical Reports documents do not fully explain how potential water quality impacts were projected and do not disclose specific findings that support the general water quality conclusions. The DEIS (see Section 4.5.1) and WQTR (see Section 3 Methods) provide only general descriptions of the analyses performed. The cited water quality analyses reportedly used modeled monthly flow, existing and projected data, and a combination of both qualitative and quantitative techniques to assess potential impacts, but no specific methodology or documentation is provided for how this was conducted.<sup>2</sup> EPA recommends that the analyses describe the methods used, assumptions made, data utilized or discarded, and specific findings from these analyses in a format sufficient to allow the reviewer to reach the same findings and conclusions.

*Disclosure of Impacts to Wastewater Treatment Plants:* EPA is concerned that the DEIS may not adequately address the potential impacts to wastewater treatment plants downstream of the proposed reservoirs. The DEIS does not disclose that all wastewater treatment plants downstream of the reservoir intakes would need to be re-permitted with recalculated water-quality-based effluent limits, and meeting these new limits could require treatment plant upgrades. The effects to wastewater treatment plants were estimated using mass balance calculations for the project alternatives (see WQTR p. 15), but presented without any documentation of the methods, assumptions, data, or specific findings. The water quality analysis uses mass balance calculations to estimate the changes in water quality due to the project alternatives at the locations of six waste water treatment plants. A brief description of some of the conclusions/ changes based on this undocumented analysis is all that is disclosed (e.g., WQTR Table 13). EPA recommends that the analysis explicitly use the State's published methods for determining water-quality-based effluent limits, evaluate all pollutants of concern (all pollutants having reasonable potential to violate water quality standards) segment by segment, and compare existing conditions to future modeled conditions. EPA recommends that this analysis include and document mass balance calculations equivalent to those used by the Colorado Water Quality Control Division in developing permit limits for wastewater discharges (see: <http://www.cdphe.state.co.us/regulations/wqccregs/index.html> [Regulation 61]).

Further, EPA is concerned with the assumption in the DEIS mass balance analysis that water quality upstream of each of the wastewater treatment plants analyzed would be the same as it is now, except for flow. Each successive mass balance calculation needs to take into account the projected changes in upstream water quality from their upstream neighbor's discharge. In addition, the mass balance analysis was done at mean (average) monthly values. EPA recommends that this analysis be performed at low and high flow as well, and for every month of the year, and take into account higher pH, and higher temperatures, which the DEIS acknowledges are impacts that will occur. The Ammonia Toxicity Model (AMMTOX), used by the State, is available for distribution and incorporates the cumulative impacts of increased temperatures, reduced flows, and upstream effluent limits.

---

<sup>2</sup> e.g., The WQTR states "[t]he analysis of water quality impacts to the Poudre River upstream of Shields Street in western Fort Collins and of the South Platte River downstream of the Poudre River was completed by reviewing existing water quality data at various flow rates to determine how various water quality parameters might change due to changes in flows" WQTR, pp. 14-15.





Analysis of Impacts to the Poudre River, downstream of Glade Reservoir: EPA is concerned with the assumptions in the DEIS concerning water released from Glade Reservoir. Water released from Glade Reservoir into the Poudre River and Horsetooth Reservoir will have the water quality characteristics of conditions at the reservoir outlet, rather than mainstem riverine conditions. Water temperature, dissolved oxygen, nutrients and metals are commonly altered with reservoir storage. EPA believes that the analysis does not take into account these differences in that it assumes that Poudre River water quality will be maintained regardless of storage periods and reservoir aging. EPA recommends that the analysis disclose the estimated residence time for Glade Reservoir water, the potential quality of water released, and model the potential changes to the water quality of the receiving waters.

Analysis of Impacts to the Poudre River and South Platte River Stream Morphology/Aquatic Life: It appears that the DEIS and the Aquatic Biological Technical Report do not adequately address how the reduce spring peak flows and changes to stream morphology will impact channel complexity and aquatic communities. While the DEIS and Stream Morphology Technical Report address changes in flow duration, flood frequency, and stream power, the documents do not provide an adequate assessment of how changes in the annual snowmelt peak flows will influence sediment transport, sediment deposition or changes in channel complexity. Substantial reductions in spring peak flows are likely to impact sediment transport processes in the Poudre and South Platte Rivers, leading to finer grained bed sediments and losses in channel complexity (natural riffle-pool sequences). EPA recommends additional analysis as to how the reduced spring peak flows will impact channel, grain-size distribution of bed sediments, and aquatic communities. A thorough literature review of analogous streams and the geomorphic importance of annual flow and impacts when spring peak flows are reduced or removed is advised (see Andrews 1984; Andrews & Erman 1986; Rathburn et al, in press).

We are also concerned that the DEIS may not adequately address changes to the aquatic habitat and communities from the expected changes in water quality and stream morphology. Impacts to aquatic communities were addressed in the Aquatic Biological Resources Technical Report, with analyses that were limited only to direct habitat changes in low, average and high flow scenarios. The results of the analyses indicated that the lower velocity during runoff and less scouring of the substrate would tend to be beneficial. The reduction in the flows to the Poudre River may result in an inability for the river to support aquatic life use standards due to changes in ambient environmental conditions such as temperature, dissolved oxygen, fine sediment deposition and habitat availability (channel complexity and floodplain access). Changes in these conditions can influence the abundance and distribution of native fish, macroinvertebrate and algal communities, and may lead to a community structure dominated by species tolerant to degraded water conditions. Furthermore, loss of overbank flows eliminates connectivity with floodplain habitats that provide greater surface area and increased support for fish and certain species of wildlife to use previously unavailable habitat. EPA recommends additional analyses to address these potentially significant adverse impacts (see Poff et al 1997).

EPA Believes that additional analyses that address impacts to aquatic communities from changes to temperature, dissolved oxygen, fine sediment deposition and habitat availability





(channel complexity and floodplain access) are necessary to determine the impact of the project. Furthermore, the importance of flood disturbances, including annual snowmelt peak flows, in maintaining diversity of physical habitat, macroinvertebrate and native fish diversity has been well documented in the peer-reviewed literature, and EPA recommends that a synthesis of this literature from analogous systems be incorporated into the Final EIS. EPA believes the change in aquatic communities associated with the proposed flow reductions may not be beneficial, in contrast to the conclusions presented in the DEIS.

*Analysis of Total Organic Carbon Impacts to Horsetooth Reservoir:* We are concerned that the DEIS and WQTR may not adequately address the impact the project will have on total organic carbon (TOC) levels in Horsetooth Reservoir. Glade Reservoir is projected to store mostly peak flows from the Poudre River basin, characterized by relatively high concentrations of total organic carbon (TOC). Water from Glade Reservoir will be conveyed to Horsetooth Reservoir for distribution. The City of Fort Collins obtains a portion of its public drinking water from Horsetooth Reservoir. The DEIS states that the water quality of Horsetooth Reservoir will not be negatively affected by inflows from Glade Reservoir from this project (DEIS p. 4-35). Glade Reservoir is projected to have TOC concentrations of approximately 4.5 mg/L. Horsetooth Reservoir is noted as having a mean TOC concentration of 2.9 mg/L (see Water Quality Technical Report Table 8, 1997-2006). The DEIS notes that chlorinated disinfection byproducts, which are likely carcinogens, are formed when water exceeding 2 mg/L TOC is treated for use as drinking water. EPA believes that inputs of TOC from Glade Reservoir to Horsetooth Reservoir will likely result in an increase of chlorinated disinfection byproducts in the drinking water supply for the City of Fort Collins. The WQTR states that the TOC in the raw water must be reduced to a concentration of no more than 2 mg/L, but there is no indication of how that will be accomplished. We believe the impacts of the high levels of TOC in Horsetooth Reservoir, and the subsequent chlorinated disinfection byproducts may be understated, not adequately addressed in the DEIS, or definitively mitigated.

*Analysis of Groundwater Impacts:* EPA is concerned that the DEIS and Technical Reports do not provide an adequate assessment of impacts of the project on groundwater recharge and stream baseflow, and consequent impacts on riparian and riverine ecology. Removal of the snowmelt-dominated spring peak flows at the mouth of the Poudre Canyon may have critical implications for groundwater and alluvial recharge in the downstream reaches of the Poudre and South Platte Rivers. Previous research has highlighted that snowmelt flows contribute significantly to local and regional groundwater recharge and support fall and winter baseflows (see Eschner et al 1983, Flerchinger et al 1992).. These contributions to groundwater are often considerable within mountain to valley transition zones like the mouth of the Poudre Canyon, where the stream channel is no longer confined by bedrock (see Covino & McGlynn 2007; Huntley 1979). The conclusions reached on page 4-39 through 4-41 of the DEIS, that there would be no negative effects to groundwater quality or quantity, are not supported by the Technical Reports. Impacts to the groundwater quality and quantity from diverting snowmelt peak flows at the Poudre Valley Canal should be quantified with reasonable certainty and further analysis is necessary to assess the impacts of the project on groundwater recharge and stream baseflow, and consequent impacts on riparian and riverine ecology. Appropriate methodologies are included in the appendix to these detailed comments and may include hydrograph separation





techniques, where groundwater recharge is quantified by separating stream discharge into in-stream and groundwater flow components as the stream exits the mountain topography (see Covino & McGlynn 2007).

In addition, streamflow quality affects local and regional groundwater conditions. The water quality characteristics of released water from reservoir storage will affect alluvial groundwater quality. EPA recommends that an analysis linking surface water to groundwater be included to evaluate these potential effects.

*Analysis of Riparian Wetland Impacts:* The DEIS and Vegetation Technical Report state that the reduction in peak flows would have little effect on riparian vegetation and wetland resources because these communities are supported by groundwater levels and stream baseflow conditions, not peak flows. EPA believes that this conclusion is based on incomplete analysis and that diverting spring peak flows may likely impact groundwater and alluvial recharge and subsequently impact riparian and wetland resources to a much greater degree than suggested in the DEIS. Once impacts to groundwater quality and quantity have been adequately quantified, EPA believes that a re-analysis of the vegetative communities will be necessary to assess the subsequent potentially significant impacts of reduced baseflow levels on riparian and wetland resources.

Potential impacts to wetland and riparian habitat from changes in stream flow are discussed in the Biological Assessment included in the draft DEIS. In summary, this assessment concludes “[b]ased on changes in morphology, channel maintenance flows, and stream stage and associated alluvial ground water, riparian and wetland vegetation in sensitive areas would likely be affected during the growing season.” This assessment appears to contradict the conclusion reached in the DEIS and highlights the need for a more thorough evaluation of potential effects on wetland and riparian habitat.

*Analysis of Impacts to the South Platte River from Galeton Reservoir and Water Exchange:* Although the geologic formations of the Galeton Reservoir and forebay area associated with this reservoir appear to create the potential for both selenium and salinity transport, the DEIS does not adequately assess the potential environmental impacts of both of these contaminants relative to the South Platte River watershed. Galeton Reservoir will be located in an area characterized as dominated by Upper Cretaceous shales and sandstone rock units (DEIS page 3-35), which may have significant impacts for water quality in the South Platte River basin. A technical memorandum dated May 6, 2006 on the preliminary assessment of Galeton Dam and Reservoir recommended that due to the geologic composition of the site, a seepage analysis be conducted to determine the rate of flow and leakage potential. EPA recommends that this seepage analysis be done, and if there are selenium or salinity impacts to the watershed, they be disclosed.

According to USGS studies, selenium can be oxidized by nitrate from irrigation on Cretaceous marine shale in western Colorado (see <http://rockyweb.cr.usgs.gov/frontrange/energy/salinesoils.htm>). The Poudre River is on the 2008 Colorado CWA 303(d) list for selenium from Boxelder Creek to the South Platte River (and over the Colorado border in Nebraska). The project may introduce an additional source of





selenium to the South Platte River. Additionally, saline soils have been problematic in arid Colorado. USGS studies have shown that saline soils are common in Colorado along floodplains above Cretaceous soils, with geologic composition similar to that of the Galeton Reservoir site. (See also Otton & Zielinski, 2000; Wright 1999).

In addition, there are multi-State agreements on Platte River depletions due to threatened and endangered species on the Platte in Colorado and Nebraska. The U.S. Fish and Wildlife Service's final biological opinion, included in the DEIS and dated October 5, 2007, cites the Programmatic Biological Opinion (PBO) on the Platte River Recovery Implementation Program, and concludes that the proposed NISP action is not likely to jeopardize the continued existence of the federally endangered species in the Poudre River or in the South Platte River (including downstream in Nebraska). EPA recommends that the Final EIS clarify whether the PBO and Platte River Recovery Implementation Program took into account changes to water quality, as well as changes to water quantity.

*Impacts to Agriculture:* EPA is concerned that the DEIS may not adequately address impacts to changes in water quality to be delivered for agricultural uses. The project as proposed anticipates trading higher quality (e.g., lower salinity) Poudre River water for lower quality South Platte River water, for agricultural use. The project could potentially be introducing water with significantly higher salinity for agricultural use. This may have a negative impact on agricultural productivity and soil conditions. Salt build-up in soils can have deleterious effects on soil quality and plant health and may require increased soil maintenance and management activities. A 1999 study at Colorado State University found that use of South Platte River waters for irrigation in the Poudre River basin was viable but the anticipated increase in salinity would have to be closely managed (Gates 1999). The study also raised concerns with potential increased concentrations of microbial contaminants and nutrient-related parameters. EPA believes the DEIS has not analyzed these issues in detail and may have inappropriately concluded in Table 4-6, that the proposed action will have no impact on agriculture. EPA recommends that potentially increased salinity, metal loadings, microbial contaminants and nutrients to receiving soils, surface and groundwater, and the impacts those water quality issues might have on agriculture, be fully evaluated.

*Evaporation Rates:* EPA believes that the DEIS may not adequately discuss evaporation rates, which may be significant for both Glade and Galeton Reservoirs. The technical supporting documents indicate that standard published information on evaporation rates was used in the calculations. EPA recommends that more project-specific information be included in the Final EIS in order to more accurately address the implications to water quality and to weigh potential implications of reservoir storage versus conservation efforts. Although the information may be included in the technical hydrology documents, EPA recommends that the Final EIS include a summary of the evaporation rates assumed for various portions of the project. EPA believes that this information is relevant to review the influence of evaporation on the overall project efficiency, and particularly in comparing various alternatives (including agricultural conservation measures discussed in the CWA 404 Section, below).





### **Compliance with the CWA Section 404(b)(1) Guidelines**

EPA is providing comments on the CWA Section 404 permit application for the project, which the Corps circulated for public review concurrently with the DEIS. The Corps intends for the DEIS to address compliance with the CWA Section 404(b)(1) Guidelines, 40 CFR Part 230 (Guidelines). EPA believes the DEIS has not provided sufficient information to determine compliance with the Guidelines in accordance with 40 CFR §230.12 due to: 1) inadequate analysis regarding the availability of less environmentally damaging practicable alternatives (40 CFR §230.10(a); 2) inadequate information and analysis regarding potential violations of State water quality standards (40 CFR §230.10(b)); 3) inadequate information and analysis regarding the potential for the proposed action to cause or contribute to significant degradation of waters of the U.S., specifically the Poudre and the South Platte Rivers (40 CFR §230.10(c)); and 4) lack of a detailed mitigation plan (40 CFR §230.10(d)). EPA believes additional analyses are necessary before the Corps proceeds with the decision on the CWA Section 404 permit.

In addition, EPA believes the Poudre and South Platte Rivers are aquatic resources of national importance (ARNIs). EPA believes the proposed action may result in substantial and unacceptable impacts to these ARNIs. Pursuant to CWA Section 404(q) and Part IV(3)(a) of the 1992 Memorandum of Agreement between EPA and the Corps, EPA requests that the Corps re-evaluate impacts to waters of the U.S. resulting from the proposed action and reconsider the availability of potential practicable alternatives prior to a determination on the permit application.

#### *40 CFR §230.10(a) Alternatives Analysis:*

EPA believes that the DEIS unnecessarily constrained the alternatives analysis by applying screening criteria (e.g. firm yield, regional project, and timeliness) which may have led to the exclusion of other potentially less environmentally damaging practicable alternatives. EPA notes the Agency has raised the concern regarding screening criteria with the Corps at numerous pre-application meetings.

EPA is concerned that because all screening criteria were based upon the 40,000 AF of projected need, the alternatives analysis may be artificially constrained. The screening criteria were applied to the 40,000 AF projected need, which was calculated by multiplying historic water use factors (gpcd) by projected population growth. However, water use factors tend to decrease over time with the development and introduction of new technologies, ordinances, changes in land use, growth patterns, etc. Thus, projecting future water demands by using historic 'water use factors' would tend to overestimate future water demand. This is supported by data provided in the DEIS which demonstrates that the Participants' average gallons per capita day (gpcd) have dropped significantly from 1988 to 1998-2003 (see DEIS Tables 1-6 and 1-7). Because all subsequent screening criteria were based upon the 40,000 AF, potential overestimation of this need could have eliminated viable alternatives. In addition, the DEIS states "firm yield" alternatives need to have 30% of 40,000 AF, or 12,000 AF of firm yield to pass the screening criterion. Although this percentage reduction was done to reduce the number





of water supply sources to a logistically reasonable number of alternatives to be analyzed in the DEIS, the value of 30% appears arbitrary. Please provide the rationale for choosing 30% as the “firm yield.”

EPA believes the language used in the Purpose and Need statement describing a “regional project” coordinated by the District does not necessarily imply a single storage project as a common solution (as inferred in the DEIS page 2-5) but may also suggest that it could be a cooperative water planning effort to maximize water supply efficiency. The term “regional project” as used in the DEIS has the effect of eliminating several alternatives because the alternatives did not meet the project’s stated purpose and need.

The DEIS also used a criterion of “timeliness” which, as used in the DEIS, has the effect of eliminating several alternatives from consideration. While EPA understands the importance of this issue to the region, the DEIS also states that Participants will likely seek temporary measures to address shortages (i.e., short-term leases). The ability to access these measures should be considered when examining the alternatives. Such timeliness factors should not render an alternative impracticable and delays are generally not an appropriate basis for screening alternatives.

Consistent with EPA’s concerns regarding the screening criteria, EPA believes that the DEIS does not support the Proposed Action as the least environmentally damaging practicable alternative (LEDPA). EPA is concerned that alternatives exist that would have less adverse impacts to the aquatic environment, specifically alternatives which include agricultural-municipal leases and long-term transfers, and conservation.

Leasing agricultural water rights may be a practicable alternative under the Guidelines and may be less damaging than the proposed action. The DEIS states in Chapter 1 that the six participants facing immediate water shortages “would likely use strategies such as short-term leases for temporary water supplies (short term leases are not reliable long-term water supply).” If short term leases are used by Participants for water supplies, even if as a temporary measure, it appears that leases reflect a practicable alternative for water supplies under the Guidelines. The applicant needs to clearly demonstrate why short term leases and other agriculture to municipal use options that could allow for the preservation of agriculture are not practicable. EPA believes such options could be practicable alternatives. In addition, the State of Colorado has identified agriculture to municipal use options that preserve agriculture as viable and has invested \$1.5 million to explore and identify institutional arrangements that would allow for such approaches. (Statewide Water Supply Initiative, Phase II Report, CDM 2004; <http://cwcb.state.co.us/IWMD/AlternativeAgriculturalWaterTransfersGrantProgram/>)

EPA believes that conservation efforts should be more fully considered. Although the DEIS states that “conservation plays an important role in each NISP participants’ present and future water demand and is therefore represented as a decreased demand for NISP rather than additional sources of water,” neither the DEIS nor the Technical Report document how this has been factored into decreasing the demand for NISP. Given the arid nature of the west, conservation will play an increasingly critical role in allowing for a sustainable water future, and





as such may play a critical role in water supply. EPA notes the Colorado Water Conservation Board (CWCB) supports this perspective (see for example <http://cwcb.state.co.us/Apps/hb1365/cwcbhtml/management.html>). Other water utilities such as Denver Water have supported this perspective, by identifying conservation (along with water reuse and securing additional water supplies) as one area of focus for securing their future water supply. EPA believes an analysis examining the cost associated with the active financial investment in conservation approaches relative to the cost of the current proposed and reduced size of the project is necessary.

EPA believes the No Action alternative may be a practicable alternative under the Guidelines and, pending additional factual determinations (40 CFR 230.11), may have fewer impacts than the other alternatives analyzed because it does not include the direct (42 acres) and potentially significant secondary adverse impacts resulting from the proposed action (reduced flows). According to the NISP Wetlands and other Waters Technical Report (page 54), the “No Action Alternative would involve almost no changes in the baseline stream flows or stream stage (ERO 2008) because this alternative relies on the transfer of agricultural water. The transferred water is similar to the amount of water that is currently consumed by crop use, and the transfer would require the historical amount and timing of return flows to be maintained.” In addition, estimates of direct impacts to wetlands associated with agricultural transfers (1,384 acres) in the No Action alternative are based upon transfers that dry up agricultural lands, and thus, alternatives which allow for the preservation of agriculture may reduce the direct impacts to wetlands and other waters. The Statewide Water Supply Initiative Report (2004) acknowledges that there is adequate agricultural water available in northeastern Colorado to meet projected future demand. This information, as well as the fact that the Front Range municipalities will likely purchase agricultural water with or without the proposed action, supports the potential that the No Action alternative may be considered a practicable alternative under the Guidelines.

EPA also believes that a combination of alternatives could serve to meet a portion of the defined need and may potentially be less damaging than the alternatives analyzed in the DEIS. For example, conservation (i.e., supply and demand side conservation, including agricultural conservation) and alternative agricultural to municipal transfers could, in combination, meet the proposed need and be less environmentally damaging than the alternatives analyzed. Additionally, by first identifying the role of conservation in meeting a portion of overall project need, this will reduce total project supply need figures and re-establish the viability of previously discarded alternatives eliminated in the screening process.

40 CFR §230.10(b) Water quality and anti-degradation:

EPA believes that the DEIS does not contain sufficient information to determine whether the discharge causes or contributes, after consideration of disposal site dilution and dispersion, to exceedances of State water quality standards. It is unclear whether this project would exacerbate existing water quality problems due to loss of dilution flows, and adequate analyses of whether or not the depletions resulting from this project will violate state water quality standards for several heavy metals, pH, temperature and dissolved oxygen were not included in the document. For example, the DEIS presents unsupported conclusions regarding the effect on the narrative





standards for aquatic life from project-induced water quality degradation in the Poudre River. The DEIS suggests altered hydrology of the proposed action reducing or eliminating natural flushing flows will result in a decrease in dissolved oxygen, particularly in summer months, potentially leading to exceedances of the water quality standard for dissolved oxygen. This, combined with potential changes in pH and increases in instream temperatures, could have significant implications for the integrity of aquatic biological communities.

#### *40 CFR §230.10 (c) Significant Degradation:*

EPA is concerned that compliance with the requirements of Section 230.10(c) have not been clearly demonstrated. In accordance with the Guidelines, determining significant degradation requires the direct consideration of effects on such functions and values as wildlife habitat, aquatic ecosystem diversity, stability and productivity, recreation, aesthetic, and economic values. The Guidelines also explicitly require consideration of all direct, secondary, and cumulative impacts reasonably associated with the proposed discharge (see 40 CFR §§230.11(g) and (h)). Contrary to the requirements, the proposed action does not adequately reflect consideration of secondary impacts to functions and values as required by 40 CFR §230.10(c). Specifically, secondary impacts to aquatic resources (both wetland and aquatic habitat) in the Poudre and South Platte Rivers related to the discharge are insufficiently addressed in the DEIS.

The disclosure of impacts needs to include an identification of any adverse environmental effects that cannot be avoided should the proposal be implemented. We recommend that the Corps address both beneficial and detrimental effects, even if on balance the Corps believes the effect will be beneficial. EPA is concerned that, for multiple resources, the DEIS does not adequately address the detrimental effects of the proposed action, and thus understates the significance of impacts to aquatic resources. For example, the DEIS states that there will be “benefits provided by reduced flows” for the aquatic communities affected by the project, based upon their physical habitat simulation modeling. However, the Aquatic Biological Resources Technical Report states that “the changes to channel morphology, the increased in sedimentation, degraded water quality, and the greater occurrence of low flows would be detrimental to both fish and invertebrates.” The DEIS and supporting reports provide little or no analysis of the significance of these effects on aquatic communities (i.e., loss of aquatic habitat), and does not adequately weigh these detrimental effects against the beneficial effects illustrated by the physical habitat modeling exercise. It is likely that changes in these parameters caused by the proposed action will be detrimental to aquatic communities and may outweigh the “benefits provided by reduced flows.”

The diversion of water from the Poudre River to meet water supply needs will significantly alter the natural hydrology downstream of the diversion point, thus affecting the aquatic ecosystem downstream. Diversion of the snowmelt peak flows in wet and average years will substantially reduce the frequency of medium and high flow events, which may likely, in turn, affect stream morphology, instream water quality, the physical habitat template of



downstream aquatic communities, the recharge of alluvial groundwater, the ability for cottonwood recruitment and inundation of backwater and floodplain habitats. The document fails to adequately address the impacts resulting from removal of these flows on the downstream aquatic ecosystem. Additional information is needed, either in the form of additional analyses or a literature review of analogous systems, regarding:

- Impacts to riparian areas from depletions and loss of high flow event periods;
- Impacts to floodplain functions and values from depletions and loss of high flow event periods;
- The fining of bed sediments and implications for juvenile fish and aquatic macroinvertebrates;
- Losses of channel complexity and maintenance of riffle and pool complexes,
- Changes in groundwater recharge and implications for maintenance of fall/winter baseflows and associated riparian communities; and
- Changes in water quality parameters, such as temperature, dissolved oxygen, and pH, which may affect the ambient conditions for aquatic life use.

#### *40 CFR§ 230.10(d) Mitigation:*

Pursuant to 33 CFR §332.4 and 40 CFR §230.94, *Compensatory Mitigation for Losses of Aquatic Resources*, a compensatory mitigation plan must be submitted and approved by the Corps before the District Engineer can issue an Individual CWA Section 404 permit. This plan must address a number of critical details regarding the mitigation project including: clearly articulated project goals and objectives; project site selection criteria; site protection instruments (e.g., conservation easements); detailed quantitative and qualitative baseline information describing both the impact and compensation sites; a detailed discussion of the mitigation project's credit determination methodology and results; a maintenance plan; ecological performance standards used to evaluate the degree to which the compensation projects are replacing lost functions and area; detailed monitoring requirements; a long-term management plan describing necessary long-term stewardship of the compensation sites and who is responsible for performing this stewardship; an adaptive management plan; and financial assurances to ensure project construction, implementation, and long-term management.

The mitigation described in Chapter 5 of the DEIS is not sufficiently detailed to address the environmental impacts of this project. EPA recognizes that the Corps has not selected a preferred alternative and has left the mitigation open for comment. EPA believes the mitigation should be defined at a level where the environmental impacts of this project are addressed.

#### *Aquatic Resources of National Importance:*

EPA believes the Poudre and South Platte Rivers are ARNIs. Both the Poudre River and the South Platte River represent perennial, mainstem river corridors in a semi-arid high plains landscape. Because wetlands comprise approximately 1-2% of the arid landscape in Colorado, the riparian wetland complexes, which are special aquatic sites (40 CFR §230.41), associated with these rivers provide a rare and unique habitat. Additionally, the Poudre Basin is the largest of four sub-watersheds of the South Platte with headwaters within the Rocky Mountains.





Segments of the Poudre River downstream of the proposed discharge are moderate gradient and are characterized by pool and riffle complexes, also special aquatic sites under the Guidelines (40 CFR §230.45).

The South Platte River Basin drains an area of approximately 24,300 square miles and is located in Colorado, Nebraska and Wyoming. The South Platte River headwaters are located in the mountains of central Colorado and southern Wyoming and the river flows northeast across the Great Plains into Nebraska to its confluence with the North Platte River, where the two rivers become the Platte River proper. The South Platte River is composed of two physiographic regions, mountains and plains. Elevation in the basin ranges from 14,286 ft to 2,750ft and climate and temperatures vary with elevation differences. Above 8,000 ft (Jarrett 1990), precipitation is dominated by winter snowfall, which can be in excess of 300 inches, leading to an annual hydrograph dominated by a single snowmelt peak in the late spring months (May, June, July). This peak snowmelt is responsible for the transport of sediments and nutrients downstream and has implications for juvenile fish and macroinvertebrates that rely on these high flow events. In the plains, annual precipitation is largely dominated by summer convective storm events and ranges from 7 to 15 inches.

The lower South Platte River, and a buffer area of ½ mile, is considered by the Colorado Natural Heritage Program (CNHP) to be a Potential Conservation Area for the Bald Eagle (*Haliaeetus leucocephalus*), a former threatened and endangered species recently taken off the endangered species list, as well as other threatened and endangered species and State Species of Concern. An excerpt from the CNHP site report states, “[i]n addition to Bald Eagles the aquatic resources of the site support occurrences of the Snowy Egret, White Pelican, and Preble’s meadow jumping mouse. Plains Cottonwood Riparian Woodland (*Populus deltoides* ssp. *monilifera* / *Symphoricarpos occidentalis*), Sandbar Willow/bare Ground (*Salix exigua* / bare ground), Narrow-leaf Cattail Marsh (*Typha angustifolia* – *Typha latifolia*), Great Plains Marsh (Sandhills Bullrush Marsh), Montane Riparian Woodland ( *Picea pungens* / *Betula occidentalis*) are some of the riparian and wetland communities present in the area. Wild Black Currant (*Ribes americanum*), Ebony Spleenwort (*Asplenium platyneuron*), and Pale Blue-eyed grass (*Sisyrinchium pallidum*) are state rare plants found within the site.” (See CNHP 2008)

The South Platte River Basin is the most densely populated area within the Rocky Mountain region, with the majority of this population inhabiting the Front Range urban corridor at the mountains to plains transition. Land use in the basin consists mostly of rangeland and agriculture, with less forested and urban lands. Development in the South Platte Basin began in the 1840’s and impacts to the aquatic environment have been caused by ditches, canals, reservoirs, diversions and groundwater pumping. Alterations in flow regime due to water development activities have caused the mainstem rivers within the basin to become more narrow and sinuous, due to encroaching riparian vegetation. Reductions in snowmelt peak flows due to reservoir storage and increased baseflows from irrigation have led to increased development of woody vegetation within the riparian corridor, reducing the ability of Cottonwood and associated vegetation to establish (Fausch & Bestgen 1997).

Despite the intensive development pressure, the South Platte River is a critical aquatic





resource for the central flyway, providing resting and feeding cover for migrating waterfowl, shorebirds and neotropical migratory birds (see USFWS 2008 a). The United States Fish and Wildlife Service (USFWS) Partners for Wildlife and Fish Program has designated the lower South Platte River as a Focus Area, with the goals of restoring and maintaining groundwater recharge and floodplain habitats along the river. Numerous partners are working in cooperation with private landowners along the South Platte River to protect the abundant recreation opportunities available in the wildlife concentration areas provided by the river/riparian corridor. The Partners Program has highlighted intensive water development and future residential development within the South Platte River Basin as the major threats to the Focus Area.

The South Platte and Arkansas River basins (southern region of the Platte River Basin) contain 33 families of native fishes. Previous research has shown that these fish species have evolved reproductive life history traits in response to the harsh, fluctuating environment characteristic of Plains streams. Some of the native fishes within the Platte River basin only inhabit cooler, clear streams of the transition zone, including the Poudre River downstream of the canyon mouth. Of the 33 families within the South Platte and Arkansas River basins, 9 (27%) are unique and not located in other parts of the Platte River Basin, likely due to the greater proportion of transition zones and spring-stream habitats located within these sub-basins. These unique taxa have relatively narrow habitat requirements, especially associated with fluctuating temperatures and low dissolved oxygen conditions to which many plains fishes are tolerant, and as such are susceptible to groundwater depletion and urban development within the spring and transition zone environments (see Fausch & Bestgen 2007).

The Poudre River, a major tributary to the South Platte River, drains an area of approximately 1,890 square miles and is located in north-central Colorado. Like the South Platte River, the Poudre River is composed of two physiographic regions – mountains and plains. The mountainous upper region of the Poudre River ranges in elevation from over 13,000 feet in the headwaters to 5,300 feet at the mouth of the Poudre Canyon. The majority of lands within the upper Poudre River Basin fall within the boundaries of Rocky Mountain National Park or the Roosevelt National Forest. Almost in its entirety, the upper Poudre, including the South Fork, is protected under the National Wild and Scenic Rivers Act and is currently the only river segment in Colorado with this designation. In 1986, seventy six miles of the Poudre River were designated under the act, with 30 miles classified as wild and 46 as recreational (see National Wild and Scenic Rivers 2008). The Colorado Water Conservation Board has four decreed instream flow water rights to establish minimum flows on the mainstem within the Wild and Scenic river segment, as well as 52 other instream flow rights on tributaries within the upper Poudre Basin. The downstream extent of the Wild and Scenic River designation and instream flow requirements are just upstream of the mouth of the Poudre Canyon, where the diversion for the proposed action is located.

Downstream of the mouth of the Poudre Canyon, the Poudre River flows east for 55 miles across the plains to the confluence with the South Platte River, located east of Greeley, Colorado. Elevation at the confluence with the South Platte River is approximately 4,600 ft. At the confluence with the South Platte River, the physical template of the stream is similar to the South Platte River, with low gradient and sandy bed substrates. Within the upper reaches of the





lower Poudre River mainstem, the physical habitat template represents a transitional zone between the high gradient confined channel of the upper Poudre River and the low gradient channel at the confluence with the South Platte River. This transition zone, intermediate between mountains and plains, is characterized by cool water, moderate gradient and coarse substrate, and provides an important lotic habitat for unique fish assemblages within the central and southwestern Great Plains (see Fausch & Bestgen 1997). Changes in water quality and stream morphology due to diversion of spring snowmelt flows and reduced baseflows in the remainder of the year may substantially influence the aquatic communities in this segment. Fishes within the South Platte and Poudre Rivers have adapted reproductive and recolonization strategies to the highly variable nature of flow and temperature regimes that are no longer consistent with the current water management. Upstream dispersal of adults and downstream movements of juveniles, eggs and larvae can be impacted by alterations in natural flow regimes caused by diversion dams and reservoir storage (see Fausch & Bestgen 1997). Furthermore, altered flows may facilitate invasion of non-native species that are more adapted to the dampened flows within a regulated environment.

Riparian areas along the Poudre River are variable, ranging from extensive riparian areas within wide floodplains to narrow riparian areas within a confined channel. Many reaches of the Poudre River support wide riparian areas with cottonwood stands, depressional floodplain wetlands, and wetlands adjacent to the channel. Impacts to riparian areas due to urban and agricultural human alteration are variable along the Poudre corridor, with levees and channelization that at times only allow for a narrow band of riparian vegetation adjacent to the channel. The USFWS Partners for Wildlife and Fish Program has included the Poudre corridor as part of its Front Range Focus Area to protect the Preble's Jumping Mouse and its associated wetland and riparian habitats (see USFWS 2008 b).

Along the Poudre River, wider riparian areas are classified as Mesic Mixed Woodlands, and are dominated by cottonwood, with some crack willow, box elder, Siberian elm, peachleaf willow, and Russian olive. Pasture grasses such as smooth brome, orchard grass, and timothy typically dominate the understory. Shrubs include chokecherry, snowberry, Woods' rose, and currant. Palustrine Persistent Emergent and Palustrine Scrub-Shrub Wetlands have established adjacent to the active channel and in depressions in the floodplain. In floodplain depressions, species such as threesquare, Baltic rush, sedges, foxtail barley, and redtop are common. Adjacent to the channel, wetlands are typically dominated by reed canary grass and sandbar willow, which appear to establish in sediment deposits. Wetlands with colonized sediment deposits occur in confined and channelized reaches, as well as in areas with wider floodplains. The location and extent of the wetlands in and adjacent to the channel changes over time as sediment is redistributed.

The Poudre River (including segments downstream of the proposed diversion point) is intensively used by the public for recreational activities including canoeing, hiking, biking, swimming, fishing and wildlife viewing. In 1996, Congress designated 45 miles of the lower Poudre and lands within its 100 year floodplain as a National Heritage Area (NHA) "to provide for the interpretation... of the unique and significant contributions to our national heritage of cultural and historic lands, waterways and structures within the Heritage Area." The Poudre





Corridor NHA is the only NHA in Colorado and also the only NHA within the upper Missouri River Basin (see NPS 2008). Adjacent to the Poudre River corridor, there are multiple State Wildlife Areas, municipal Natural Areas, municipal Parks, a regional trail corridor, and educational centers, including the Environmental Learning Center (Fort Collins) and the Poudre Learning Center (Greeley). The economic and societal benefits of these recreational and educational opportunities are tightly coupled with maintaining the integrity of the Poudre River and associated floodplain riparian and wetland areas.

### **Other Issues**

*Water Quality Report/DEIS Inconsistencies:* Several inconsistencies exist between the DEIS and the Technical Report. For example, the DEIS references the WQTR and states that for the coldwater stream segment from the canyon mouth to Shields Street, “water quality and riparian vegetation are not expected to change from existing conditions for any of the action alternatives in this segment of the river and would have no effect on aquatic biological resources.” In contrast, the WQTR states that there will be reduced flows, warmer stream temperatures, and dissolved oxygen standards will be more frequently exceeded in this segment. The DEIS also states that “[t]he largest changes in [South Platte] streamflows will occur in fall and winter outside of the growing season” (DEIS page 4-52). The Water Resources Technical Report, Appendix C, provides data to the contrary. Conclusions are reached in the DEIS that are not supported by the DEIS or technical reports. EPA recommends that the Final EIS correct these inconsistencies.

*Energy Impacts:* Section 4.26 of the DEIS states that all the action alternatives would rely on electrical energy to power pumps to pump water, and provides power consumption estimates. The amount of energy required by this project is substantial. EPA recommends that efforts to reduce the energy use be analyzed, as well as the potential use of renewable energy sources.

*Hazardous Waste:* The 08HE Superfund Site (Cache La Poudre River site) is within the City of Fort Collins’ limits. EPA’s emergency response program has been working with Excel Energy and Shrader Oil Co. on coal tar contamination of the Poudre River at this site. A wall built 40 feet deep and 100 feet long, currently contains the contamination in addition to wells and a treatment facility. The DEIS does not discuss the impact of this project on the Superfund site. There is a question as to whether the gradient may change as river levels drop, which may allow the coal tar to run into the river again. Currently, treatment at the plant has been shut down to allow the area to reach equilibrium. EPA recommends that the Final EIS examine the potential impacts to the Superfund site, as well as means to ensure that the project will not impact the ongoing remediation.

*Atlas “E” Missile Site 13:* Trichloroethene (TCE)-contaminated groundwater is present at an abandoned Atlas “E” missile site near the junction of Routes 14 and 287, beneath the northwest corner of the proposed forebay for Glade Reservoir. EPA is assessing this TCE-contaminated groundwater plume, and is also evaluating whether the plume is migrating further towards the Poudre River. EPA recommends that a monitoring plan be required to assess whether the seasonal variations in TCE concentrations will exceed the State standards near the forebay, and





determine whether and where the plume is migrating.

Approach to Cumulative Impacts: At various points in the DEIS and Technical Reports, impacts are described to "...likely be progressive rather than sudden, could occur over decades, and may be small compared to changes that are already occurring ..." (see DEIS p. 4-32). Many physical and ecological processes tend to be non-linear and will likely exhibit "threshold-like" responses to external perturbations (see Schumm 1974 et al 1996; Ward et al 2001). These threshold responses are difficult to predict, but many are likely to have far greater environmental consequences following disturbance than linear (progressive) responses within the system. The DEIS does not adequately assess the long-term cumulative impacts and instead only addresses linear responses (and does not address uncertainty) in their predicted responses. EPA recommends that the analysis address the potential for threshold responses when assessing the long-term and cumulative impacts of the project.

The DEIS states that the proposed action has no indirect wetland effects (See DEIS Table 4-9), and instead characterizes the up to 6,909 acres of wetland impacts resulting from projected changes in land use, construction and development under the proposed action, as "cumulative effects (see DEIS Table 4-20). EPA recommends that this characterization be re-examined, and suggests that these types of impacts may be more properly termed as "indirect impacts."

Additionally, because the project purpose states that this project will only meet a portion of the Participants' future water supply needs, it is reasonably foreseeable that the participants will seek additional sources of water to meet their future needs. These reasonably foreseeable sources of supply will likely include additional transfer of water from agriculture to municipal and industrial use. The indirect wetland impacts associated with this transfer of water (1,384 acres) should be considered as indirect impacts common to all the alternatives, not just the no action alternative.

*Climate Change:* The DEIS briefly cites potential changes associated with global climate change but dismisses influences as too uncertain to consider. Current science does not offer predictions of potential changes in precipitation and key climate variables specific to the Poudre River basin. However, published predictions of potential reductions in natural runoff and flow in the Colorado River Basin (Hoerling & Eischeid 2006, Seager et al 2007) suggest that this source of uncertainty should be considered in design and analysis of this project, and should be addressed in greater detail. A recent Environmental Impact Statement considering guidelines for operating lower basin storage in the Colorado River basin (U.S. Department of Interior 2007) provides an example of consideration of uncertainties in runoff and flow and potential ramifications for water project operation.

*Multiple withdrawal points:* The DEIS's consideration of potential effects of flow reductions on the Poudre River is limited to analysis of the single, upstream withdrawal location. EPA recommends analysis of withdrawal of water from multiple locations, and whether this approach might lessen the potential impacts on local water quality conditions, riparian ecology and other potential impacts discussed above.









**Appendix to EPA's Comments  
Northern Integrated Supply Project DEIS  
References**

- Andrews, E.D. 1984. Bed-material entrainment and hydraulic geometry of gravel-bed rivers in Colorado. *Geological Society of America Bulletin*, 95, 371-378.
- Andrews, E.D. and D.C. Erman. 1986. Persistence in the size distribution of surficial bed material during an extreme snowmelt flood. *Water Resources Research*, 22, 191-197.
- Colorado 2008 303(d) List (Regulation #93) – pp. 11-12  
<http://www.cdphe.state.co.us/regulations/wqccregs/100293wqlimitedsegtmdls.pdf>
- Colorado Natural Heritage Program (CNHP 2008). Potential Conservation Area (PCA) Report: South Platte River. Fort Collins, CO: Colorado State University. Retrieved August 26, 2008
- Colorado Regulation 38 – Classifications and Numeric Standards for the South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin – tables, pp. 24, 30-31  
<http://www.cdphe.state.co.us/regulations/wqccregs/wqccreg38southplatectable.pdf>
- Covino, T.P. and B.L. McGlynn. (2007) Stream gains and losses across a mountain-to-valley transition: Impacts on watershed hydrology and stream water chemistry. *Water Resources Research*, 43: W10431.
- Eschner, T.R., R.F. Hadley and K.D. Crowley. 1983. Hydrologic and morphological changes in channels of the Platte River basin in Colorado, Wyoming, and Nebraska: a historical perspective. Geological Survey Professional Paper. 1277-A, Washington, D.C.
- Fausch, K.D. and K.R. Bestgen. 1997. *Ecology of Fishes Indigenous to the Central and Southwestern Great Plains*. In: Ecology and Conservation of Great Plains Vertebrates. Knopf, F.L. and F.B. Samson, eds. NY: Springer.
- Flerchinger, G.N., K.R. Cooley, and D.R. Ralston. 1992. Groundwater response to snowmelt in a mountainous watershed. *Journal of Hydrology*, 133, 293-300.
- Hoerling, M. and J. Eischeid. 2007. Past peak water in the Southwest. *Southwest Hydrology*. January/February, 6(1): 18-19.
- Huntley, D., Groundwater recharge to the aquifers of northern San Luis Valley, Colorado. *Geological Society of America Bulletin*, Part II, 90(8), 1196-1281, 1979.
- Jarrett, R.D. 1990. Hydrologic and Hydraulic Research in Mountain Rivers. *Water Resources Bulletin*, 26(3): 419-429.
- National Park Service. (2008) National Heritage Areas. Retrieved August 26, 2008  
(<http://www.nps.gov/history/heritageareas/>)





National Wild and Scenic Rivers System. (2008) Cache la Poudre River. Retrieved August 26, 2008 (<http://www.rivers.gov/wsr-cache-la-poudre.html>)

Otton, James K., and Zielinski, Robert A. "Characteristics and Origins of Saline (alkalai) Soils in the Front Range Portion of the Western Denver Basin." Energy Research and Support Activities. 26 July 2000. U.S. Geological Survey.

Poff, N.L., J.D. Allan, M.B. Bain, J.R. Karr, K.L. Prestegard, B.D. Richter, R.E. Sparks, and J.C. Stromberg. 1997. The natural flow regime. *BioScience*, 47, 769-784.

Rathburn, S.L., D.M. Merritt, E.E. Wohl, H.A.L. Knight, and J. Sanderson. In press. Streamflow and sediment management for maintenance of river ecosystems: North Fork Cache la Poudre River, Colorado. In, A. James, S.L. Rathburn, and R. Whittekar, eds., *Management and restoration of fluvial systems with broad historical changes and human impacts*. Geological Society of America Special Paper, Boulder, CO.

Schumm, S.A. 1974. Geomorphic thresholds and complex response of drainage systems. In, M. Morisawa, ed., *Fluvial geomorphology*. Publications in Geomorphology, Binghamton, NY, pp. 299-310.

Seager, R., M. Ting, I. Held, Y. Kushnir, J. Lu, G. Vecchi, H. Huang, N. Harnik, A. Leetmaa, N. Lau, C. Li, J. Velez, and N. Naik. 2007. Model projections of an imminent transition to a more arid climate in Southwestern North America, *Science*, 316:1181-1184.

Stanford, J.A., J.V. Ward, W.J. Liss, C.A. Frissell, R.N. Williams, J.A. Lichatowich, and C.C. Coutant. 1996. A general protocol for restoration of regulated rivers. *Regulated Rivers: Research and Management*, 12, 391-413.

U.S. Department of the Interior, 2007, Final Environmental Impact Statement, Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead.

U.S. Fish and Wildlife Service. (2008 a) South Platte River Focus Area. Retrieved August 26, 2008 (<http://www.fws.gov/mountain-prairie/pfw/colorado/co31.htm>)

United States Fish and Wildlife Service. (2008 b) Front Range Focus Area. Retrieved August 26, 2008 (<http://www.fws.gov/mountain-prairie/pfw/colorado/co32.htm>)

Ward, J.V., K. Tockner, U. Uehlinger, and F. Malard. 2001. Understanding natural patterns and processes in river corridors as the basis for effective river restoration. *Regulated Rivers: Research and Management*, 17, 311-323.

Wright, W.G. "Oxidation and Mobilization of Selenium by Nitrate in Irrigation Drainage." Journal of Environmental Quality. v. 28, pp. 1182-1187 (1999).



